

## PERSONAL DATA

### ARTHUR LOUIS RUOFF

The Class of 1912 Professor of  
Engineering Emeritus  
Department of Materials Science  
and Engineering  
Bard Hall, Cornell University  
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Home Address:

216 Texas Lane  
Ithaca, NY 14850  
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Born: September 17, 1930, USA

Married: Enid Frances Seaton, January 24, 1954

Children: Five sons

Education Information: B.S. Chemistry, 1952, Purdue University  
Ph.D. Physical Chemistry and Physics, 1955,  
University of Utah

#### Honors:

Standard Oil of California Fellowship, 1952-1955

National Science Foundation Science Teacher Fellowship, 1960-1962

Western Electric Fund Award for Excellence in Instruction of  
Engineering Students, 1966-1967, presented by ASEE

Engineer of Distinction - Engineers Joint Council, 1970

American Men and Women of Science, 1970

Fellow of the American Physical Society, 1971

Who's Who in the East, 1971

The Class of 1912 Professor of Engineering, 1979

Who's Who in America, 1980

Who's Who in Technology Today, 1980

New York Academy of Science, 1984

Fellow, the Böhmische Physical Society, 1988

Bridgman Award (Presented by AIRAPT (The International High  
Pressure Association) for Outstanding High Pressure Research),  
1993. This is the prize to win in high pressure.

Honored by the University of Utah as a Distinguished Alumnus, 2003

Honored by Purdue University as a Distinguished Alumnus, 2005

#### Employment Record: (Major Positions only)

Assistant Professor, Cornell University, 1955-1958

Associate Professor, Cornell University, 1958-1965

Visiting Associate Professor, University of Illinois, 1961-1962  
Professor, Cornell University, 1965-  
Class of 1912 Professor of Engineering, 1978-  
Director, Materials Science and Engineering Dept., 1978-88  
Chairman, Program Committee of the National Research & Resource Facility  
for Submicron Structures, 1979-1986  
Currently Emeritus Professor in graduate fields of Materials Science and  
Engineering, Applied and Engineering Physics, and Earth and  
Atmospheric Sciences, 2005

Research:

Director of Thurston High Pressure Laboratory. Research in various areas of Materials Science: High Pressure including liquid and gas systems; Ultra Pressure including diamond indenter system and opposed diamond anvil system (which included reaching the highest static pressure 560GPa, (earth's core is at 360GPa)); energy dispersive X-ray diffraction in the megabar regime using synchrotron radiation; Study of insulation to conductor transitions at megabar pressures (which included making metallic oxygen and metallic sulfur); optical absorption, reflectivity and Raman spectroscopy at megabar pressures; study of strength of diamond; study of various mechanical properties; microfabrication including study of inorganic resists, development of X-ray sources, submicron fabrication of interdigitated electrodes, reactive ion beam etching.

Teaching:

Lecturing in graduate course work and undergraduate Materials Science courses. Development of audio-tutorial undergraduate courses, learning center, etc.

Committee and Administrative work at Cornell:

Of which the most important assignments have been:

- a. Member of Committee to write proposals and solicit ARPA BLOCK FUNDING SUPPORT for Materials Science. We won Member of the Executive Committee of the Cornell Materials Science Center for first five years.
- b. Organized the Graduate Field of Materials Science and Engineering, and was the first Field Representative.
- c. Work on Lloyd Smith Committee to study future organization of the Engineering College at Cornell (this reorganization was carried out).
- d. Member of Faculty Council (Advisory Committee to President).

- e. Member of University Senate
- f. Originate and run Materials Science and Engineering Research Colloquium.
- g. Organize and run College-wide Colloquium in Instructional Technology.
- h. Major contributions to Preparation and Presentation of Proposals for the National Research and Resource Facility for Submicron Structures; was the Chairman of its Program Committee for six years.
- i. Contributor to proposal for the Cornell High Energy Synchrotron Source, Member of its Executive Committee.
- j. Member of committee which wrote and made presentation for the Resource Facility for Submicron Structures.
- k. Director, Materials Science and Engineering (1978-1988).
- l. Originate and edit MS&E News (1979).
- m. Originate and run MS&E Industrial Affiliates Program (1982).
- n. Originate new Electronic Materials undergraduate degree program (1983).
- o. Originate and first Director of the Cornell Ceramics Program 1985-1995.

Other Professional Activities

Member, American Ceramics Society

Member, Materials Research Society

Member (and Fellow) American Physical Society

Co-organizer, Western New York Section, Materials Research Society

Policy Committee, University Materials Council

International Advisory Committee of AIRAPT

Committees of the Materials Advisory Board

Editorial Board: Advances in Materials Research

Regional Editor: Phase Transitions

### Consultant:

To numerous industries and laboratories on high pressure phenomena, including diamond production, to several universities on multimedia instruction.

### Other Activities:

Manager and coach for youth hockey teams and youth soccer teams

President of Ithaca Youth Hockey Association, 1972-1973

(youth hockey program for over 500 Tompkins County boys)

Director, Ithaca Youth Hockey Association

Studies of the History of Knowledge and Economics

Travel, classical music, opera and championship finals in sports

Intensive all consuming study and analysis of energy for the past ten years

### TALKS AT CONFERENCES

Has presented invited lectures at international conferences in Canada, Mexico, Brazil, Japan, India, Greece, Russia, Iran, England, Scotland, Sweden, Germany, East Germany, France, Poland, Portugal, Italy, and Holland as well as the United States.

### PUBLICATIONS

#### Articles Published

Has published over 322 articles in scientific journals and in books.

The publication list is available.

### A FEW HIGHLIGHTS

- First to reach static pressure above that at earth's core (360 GPa).
- Eventually reached 560 GPa.
- First to make metallic oxygen
- First to make metallic sulfur. At pressure of 150GPa it is a superconductor,  $T_c=17$
- Succeeded in showing that hydrogen is not yet a metal at 420GPa.

## BOOKS AND OTHER WORKS

1. With H.D. Block, Differential Equations for Engineers and Scientists, Pennysaver Press, Interlaken, New York (1961).
2. Introduction to Materials Science, 697 pp., Prentice-Hall, Englewood Cliffs, New Jersey (1972). Now published by Krieger Publishing Co., Melbourne, Florida.
3. Solution Manual for Introduction to Materials Science, 158 pp., Prentice-Hall, Englewood Cliffs, New Jersey (1972).
4. Materials Science, 926 pp., Prentice-Hall, Englewood Cliffs, New Jersey (1973).
5. Introductory Materials Science, (Audio-tutorial course) Packaged Courses, Ithaca, New York (1973).
6. Concepts of Packaged Courses (Slide-tape presentation), Packaged Courses, Ithaca, New York (1973).
7. The Declaration of Energy Independence, 148 pp., Linus Publications Inc. (2011).

## ENERGY

Statement by the author.

I have spent the last ten years thoroughly studying energy consumption and energy production, including 3D seismic surveying, drilling, chemical analysis and production, pipelines, coal production and transportation and use, uranium, mining, refining, nuclear reactor design and construction and operation and nuclear waste disposal. I also studied the world peak production rate. As I have a long term interest in economics, I also studied how the United States government spends its money. First comes the military, then entitlements, leaving nearly nothing for infrastructure, especially non-fossil fuel plants and seriously damaging manufacturing and hence destroying jobs.

I made visits to energy facilities from 3D seismic shots in Wyoming, refineries in Long Beach and Houston, oil (tar) sand production in Athabasca, Canada, geothermal production in California and New Zealand and hydroelectric facilities in the U.S., Brazil, New Zealand and China (under construction) to G.E. nuclear

reactors in the U.S. and Areva reactors in France, to G.E. windmills in Lethbridge, Canada, in California, Costa Rica and New York, and solar sites in Georgia, California, Texas, and Germany.

## FAMILY

**Wife: Enid Frances Seaton Ruoff**

Elected to the Ithaca City School Board - 2 terms.  
Trustee of the Tompkins County Library Board, 10 years.  
Distinguished Alumna of the College of Eastern Utah, 2008.

**Sons: William L.** – B.A., Cornell University, Physiology; Ph.D., University of Illinois, Reproductive Physiology, Toxicology.  
Toxicologist, Chief Risk Assessor, URS (second largest pollution control company in the world), Denver, Colorado.

**Stephen A.** -- B.S., Cornell University, Materials Science, Engineering; Founder and CEO, Ithaca Materials Research, Ithaca, New York.  
Laboratories in Ithaca, South Carolina, Kentucky, Oregon, and opening this quarter in Singapore.

**Rodney S.** – B.A., University of Texas; Ph.D., University of Illinois, Microwave Reaction Kinetics, Chemical Physics.  
Fulbright Scholar, Max Planck Institute, Gottingen, Germany.  
Cockrell Family Regents Chair, Mechanical Engineering, University of Texas.  
Awarded the Lee Hsun Award by the Institute of Metal Research, to be presented in Shenyang, China in 2009.

**Jeffrey K.** -- B.A., Cornell University, Government and French; MFA, Temple University; Fulbright Scholar, Sorbonne, Paris, France; Ph.D., University of Iowa, Film and Communications.  
Assoc. Professor, Film and Television Studies, Dartmouth College.  
Author of two books and several documentary films.  
Camargo Foundation Fellow, Cassis, France, 2009.

**Kenneth J.** -- B.A., Harvard University, Japanese; Ph.D., Columbia University; Fulbright Scholar, Kyoto, Japan.  
Assoc. Prof., Portland State University. Director of the Center for Japanese Studies. Author of two books. Winner of the prestigious Osaragi Prize for Commentary, 2004, for the Japanese translation edition of "The People's Emperor". The youngest winner and the only foreigner to win the Osaragi, (Japan's "Pulitzer").

All five sons were most valuable players in their high school sport, were starters and lettered in sports at college.

### A.L. Ruoff's Publications

1. A.L. Ruoff and H. Eyring, "The Mechanical Properties due to the  $\alpha \rightarrow \beta$  Transformation in Natural Keratin Fibres", Proc. Intl. Wood Conf., Australia, 1955, p. D-9.
2. C.E. Reese, A.L. Ruoff and H. Eyring, "The Mechanical Behavior of Polyacrylonitrile Fibres", *ibid.*, p. D-27.
3. F. Frank and A.L. Ruoff, "A Method of Measuring Poisson's Ratio of Fibers", *Textile Research Journal* 28, 213 (1958).
4. Arthur L. Ruoff, "An Alternate Solution of Stefan's Problem", *Quarterly of Applied Mathematics* 15, 197 (1958).
5. D.A. Stuart and A.L. Ruoff, "Impact Loading of Structures Using Double Acting Bombs", *Society Experimental Stress Analysis* 16, 7 (1959).
6. A.L. Ruoff, S.W. Liu and F. Frank, "Aerodynamic Heating of Parachutes", WADC T.R. 57-157 ASTIA Document No. AD 142261, (December 1957).
7. A.L. Ruoff, D.L. Prince, J. Calvin Giddings and George H. Stewart, "The Diffusion Analogy for Solvent Flow in Paper", *Kolloid-Zeitschrift* 166, 144 (1959).
8. A.L. Ruoff, and J. Calvin Giddings, "Paper Geometry and Flow Velocity in Paper Chromatography", *J. Chromatog* 3, 438 (1960).
9. J. Calvin Giddings, George H. Stewart and A.L. Ruoff, "Zone Migration in Paper Chromatography", *J. Chromatog* 3, 239 (1960).
10. A.L. Ruoff, George H. Stewart, Hyung Kyu Shin and J. Calvin Giddings, "Diffusion of Liquids in Unsaturated Paper", *Kolloid Zeitschrift* 173, 14 (1960).
11. Che-Yu Li, A.L. Ruoff and C.W. Spencer, "Effect of Pressure on the Energy Gap of  $\text{Bi}_2\text{Te}_3$ ", *J. Appl. Phys.* 32, 1733 (1961).
12. R.H. Cornish and A.L. Ruoff, "Electrical Leads for Pressure Vessels to 30 Kilobars", *Rev. Sci. Instr.* 32, 639 (1961).
13. B.M. Butcher and A.L. Ruoff, "The Effect of Hydrostatic Pressure on the High Temperature Steady-State Creep of Lead", *J. Appl. Phys.* 32, 2036 (1961).
14. R.W. Balluffi and A.L. Ruoff, "Enhanced Diffusion in Metals During Plastic Deformation", *J. Appl. Phys. Letters*, 1, 59 (1962).



15. R.W. Balluffi and A.L. Ruoff, "On Strain-Enhanced Diffusion in Metals. I. Point Defect Models", J. Appl. Phys. 34, 1634 (1963).
16. A.L. Ruoff and R.W. Balluffi, "Strain-Enhanced Diffusion in Metals.II. Dislocation and Grain Boundary-Short-Circuiting Models", J. Appl. Phys. 34, 1848 (1963).
17. A.L. Ruoff and R.W. Balluffi, "On Strain-Enhanced Diffusion in Metals. III. Interpretation of Recent Experiments", J. Appl. Phys. 34, 2862 (1963).
18. A.L. Ruoff, "Diffusion During Deformation by Surface Intensity Methods", J. Appl. Physics 36, 2207 (1965).
19. R.H. Cornish, B.M. Butcher and A.L. Ruoff, "Techniques for Measuring Creep Strains at High Hydrostatic Pressures", ASME Publication #64-WA/PT 30.
20. J.E. Hill and A.L. Ruoff, "Velocity of Sound Measurements in Liquid Metals", Rev. Sci. Instr. 36, 1465 (1965).
21. A.L. Ruoff, "Creep by Grain Boundary Diffusion", Cornell Materials Science Center Report #298 (1965).
22. A.L. Ruoff, "Mass Transfer Problems in Ionic Crystals with Charge Neutrality", J. Appl. Phys. 36, 2903 (1965).
23. A.L. Ruoff, "Space Charge Effects Near Surfaces of Stoichiometric Ionic Crystals", Materials Science Center Report #309 (1965).
24. B.M. Butcher, H. Hutto and A.L. Ruoff, "Activation Volume and Energy for Self-Diffusion in Aluminum", J. Appl. Phys. Letters 7, 34 (1965).
25. C.R. Kohler and A.L. Ruoff, "Pressure and Temperature Dependence of Creep in Potassium", J. Appl. Phys. 36, 2444 (1965).
26. A.L. Ruoff, "Activation Volumes for Creep", in Physics of Solids at High Pressure, (Tucson Conf., April 1965), Ed. by C.T. Tomizuka, Academic Press, New York (1965).
27. J.E. Hill and A.L. Ruoff, "Temperature Dependence of the Velocity of Sound in Some Liquid Metals and Eutectic Alloys", J. Chem. Phys. 43, 2150 (1965).

28. P.J. Reddy and A.L. Ruoff, "Pressure Derivatives of Elastic Constants in Some Alkali Halides", in Physics of Solids at High Pressures, Ed. by C.T. Tomizuka and R.M. Emrick, Academic Press, New York (1965) p. 510.
28. P.B. Ghate and A.L. Ruoff, "Energy of Formation of a Vacancy in Sodium", Atomic Energy Commission Report NYO-2504-13 (1966).
29. C.R. Kohler and A.L. Ruoff, "Two Ranges of Creep Behavior in Potassium as a Function of Temperature and Pressure", J. Materials 2, 20 (1967).
30. A.L. Ruoff, "A Comparison of Virial Coefficients Obtained from Shock and Ultrasonic Data for Al and Cu", J. Phys. Chem. Solids 28, 453 (1966).
31. K.M. Koliwad, P.B. Ghate and A.L. Ruoff, "Pressure Derivatives of the Elastic Constants of NaBr and KF", Phys. Status Solidi 21, 507 (1967).
32. C.R. Kohler and A.L. Ruoff, "Creep in Potassium as a Function of Temperature and Pressure", J. of Materials 2, 20 (1967).
33. G.T. Chevalier, P. McCormick and A.L. Ruoff, "Pressure Dependence of High-Temperature Creep in Single Crystals of Indium", J. Appl. Phys. 38, 3697 (1967).
34. P.S. Ho and A.L. Ruoff, "The Pressure Dependence of the Elastic Constants and an Experimental Equation of State for CaF<sub>2</sub>", Phys. Rev. 161, 864 (1967).
35. Paul G. McCormick and A.L. Ruoff, "Creep under High Pressures", Chapter in Mechanical Behavior at High Pressure, Ed. by David Pugh, Elsevier Publ. Company (1970).
36. A.L. Ruoff, "Linear Shock-Velocity-Particle-Velocity Relationship", J. Appl. Phys. 38, 4976 (1967).
37. A.L. Ruoff, "Enhanced Diffusion During Plastic Deformation by Mechanical Diffusion", J. Appl. Phys. 38, 3999 (1967).
38. P.S. Ho and A.L. Ruoff, "A Quasi-Harmonic Calculation of Lattice Dynamics for Sodium", Phys. Stat. Sol. 23, 489 (1967).

39. A.L. Ruoff, "Vacancy Concentrations in Metals During High Temperature Deformation", Chapter in Point Defects and Their Interactions, Ed. by R.R. Hasiguti, Gordon and Breach (1968).
40. P.G. McCormick and A.L. Ruoff, "Hydrostatic Pressure Dependence of Creep in Aluminum", Proceedings of Harwell Symposium 1968 on the Interactions Between Dislocations and Point Defects, H.M. Stationary Office (1968).
41. D.P. Dandekar and A.L. Ruoff, "Temperature Dependence of the Elastic Constants of Calcite Between 160 and 300 K", *J. Appl. Phys.* 39, 6004 (1968).
42. P.S. Ho and A.L. Ruoff, "Analysis of Ultrasonic Data and Experimental Equation of State for Sodium", *J. Phys. Chem. Solids* 29, 2101 (1968).
43. P.S. Ho and A.L. Ruoff, "Pressure Dependence of the Elastic Constants for Aluminum from 77-300 K", *J. Appl. Phys.* 40, 3151 (1969).
44. P.S. Ho, J.P. Poirier and A.L. Ruoff, "Pressure Dependence of the Elastic Constants for Silver from 77-300 K", *Phys. Status Solidi* 35, 1017-25 (1969).
45. K.L. Murty and A.L. Ruoff, "High-Pressure-High-Temperature Study of Spin-Lattice Relaxation in Pure and Doped LiBr Single Crystals", *Phys. Rev.* B1, 114 (1970).
46. P.G. McCormick and A.L. Ruoff, "Hydrostatic Pressure and the Mechanism of Creep in Aluminum", *J. Appl. Phys.* 40, 4812 (1969).
47. M. Ghafelehbashi, D.P. Dandekar and A.L. Ruoff, "Pressure and Temperature Dependence of the Elastic Constants of RbCl, RbBr and RbI", *J. Appl. Phys.* 41, 452 (1970).
48. C.C. Chao and A.L. Ruoff, "Precompressed Pyrophyllite for Ultrahigh Pressure Research", *Rev. Sci. Inst.* 41, 720 (1970).
49. K.L. Murty, M. Gold and A.L. Ruoff, "High Temperature Creep Mechanisms in  $\alpha$ -iron and Other Metals", *J. Appl. Phys.* 41, 4917 (1970).
50. C.V.S.H. Narayan Rao and A.L. Ruoff, "High Temperature Creep of Lithium Fluoride", *J. Appl. Phys.* 43, 1437 (1972).
51. R.E. Terry and A.L. Ruoff, "Improved Electrical Leads for High Pressure Systems", *Rev. of Sci. Inst.* 43, 1379 (1972).

52. Y.C. Chen, R.H. Martinson and A.L. Ruoff, "A Multiple-Crystal Holder for Ultrasonic Measurements", *Rev. of Sci. Inst.* 43, 1712 (1972).
53. L.S. Ching, J. Paul Day and A.L. Ruoff, "Pressure and Temperature Dependence of the Elastic Constants of LiBr and LiCl", *J. Appl. Phys.* 44, 1017 (1973).
54. R.E. Larsen and A.L. Ruoff, "Pressure-Induced Elasticity Changes in V<sub>3</sub>Si", *J. Appl Phys.* 44, 1021 (1973).
55. A.L. Ruoff, R.C. Lincoln and Y.C. Chen, "High-Pressure Calibration with a New Absolute-Pressure Gauge", *Appl. Phys. Lett.* 22, 310 (1973).
56. J. Paul Day, Paul S. Ho and A.L. Ruoff, "A cw Interferometer for Elastic Constant Measurements", *Rev. Sci. Inst.* 44, 478 (1973).
57. J. Paul Day and A.L. Ruoff, "The Pressure Dependence of the Elastic Moduli of a Tungsten Carbide Cermet", *J. Appl. Phys.* 44, 2447 (1973).
58. "A.L. Ruoff, Multi-Media Materials Science", *Educ. Res. Meth.* 4 #4, 25 (1972).
59. R.C. Lincoln and A.L. Ruoff, "Absolute Length Measurement at High Pressure", *Rev. Sci. Instrum.* 44 1239 (1973).
60. A.L. Ruoff, "Penultimate Static Pressure Containment Considerations and Possible Applications to Metallic Hydrogen Preparation", in *Advances in Cryogenic Engineering*, Ed. by K.D. Timmerhaus, 18, 435 (1973).
61. A.L. Ruoff, R.C. Lincoln and Y.C. Chen, "A New Method of Absolute High Pressure Determination", *J. Phys. D: Appl. Phys.* 6, 1295 (1973).
62. K.J. Dunn and A.L. Ruoff, "First and Second Pressure Derivatives of the Bulk Modulus of Sodium", *Phys. Rev. B* 10, 2271 (1974).
63. J. Paul Day and A.L. Ruoff, "The Variation of Elastic Constants of Lithium with Temperature and Pressure", *Physica Status Solidi* A25, 205 (1974).
64. A.L. Ruoff, "Yield Stress Determination as a Function of Pressure at Very High Pressures", *Scripta Metallurgica* 8, 1161 (1974).

65. A.L. Ruoff, "Stress Anisotropy in Opposed Anvil High-Pressure Cells", *Journal of Applied Physics* 46, 1389 (1975).
66. A.L. Ruoff and John Wanagel, "Yield Stress of Cemented Tungsten Carbide", *Journal of Applied Physics* 46, 4647 (1975).
67. Jaime O. Chua and A.L. Ruoff, "Pressure Dependence of the Yield Stress of Potassium at Low Homologous Temperature", *J. Appl. Phys.* 46, 4659 (1975).
68. J.O. Chua, R.E. Terry and A.L. Ruoff, "Dynamic High Pressure Seal for Low Temperatures", *Rev. Sci. Instrum.* 46, 1708 (1975).
69. A.L. Ruoff and John Wanagel, "High Pressures with Supported Opposed Anvils", *Rev. Sci. Instrum.* 46, 1294 (1975).
70. W. Sachse and A.L. Ruoff, "Elastic Moduli of Precompressed Pyrophyllite Used in Ultra-high Pressure Research", *J. Appl. Phys.* 46, 3725 (1975).
71. J. Wanagel and A.L. Ruoff, "Radioactive Decay Rate as the Basis of an Ultrapressure Gauge", *J. of Phys. E: Scientific Instruments* B, 423 (1975).
72. K.Y. Kim and A.L. Ruoff, "Pressure and Temperature Dependence of the Elastic Moduli of a Low-Expansion Lithium Aluminum Silicate Glass Ceramic", *J. Am. Ceramic Soc.* 58, 352 (1975).
73. A.L. Ruoff and C.V.S. Narayan Rao, "Effect of Impurities on the High-Temperature Creep of LiF", *J. Am. Ceramic Soc.* 58, 503 (1975).
74. K.Y. Kim, R.E. Terry and A.L. Ruoff, "Improved Technique for Shaping Long Fragile Alkali Halide Crystals", *Rev. Sci. Instrum.* 47, 636 (1976).
75. John Wanagel, V. Arnold and A.L. Ruoff, "Pressure Transition of AIP to a Conductive Phase", *J. Appl. Phys.* 47, 2821 (1976).
76. K.Y. Kim and L.C. Chhabildas, "Isothermal Equations of State for Lithium Fluoride", *J. Appl. Phys.* 47, 2862 (1976).
77. L.C. Chhabildas and A.L. Ruoff, "Isothermal Equation of State for Sodium Chloride by the Length-Change-Measurement Technique", *J. Appl. Phys.* 47, 4182 (1976).

78. A.L. Ruoff and L.C. Chhabildas, "The Sodium Chloride Primary Pressure Gauge", *J. Appl. Phys.* 47, 4867 (1976).
79. A.L. Ruoff and K.S. Chan, "Analysis of Contact Pressures Attainable Using Indentors Which are Bodies of Revolution", *J. Appl. Phys.* 47, 5077 (1976).
80. L.C. Chhabildas and A.L. Ruoff, "The Transition of Sulfur to a Conducting Phase", *J. Chem. Phys.* 52, 983 (1977).
81. A.L. Ruoff and J.O. Chua, "Elastic Scaling Parameters in the Yield Stress of Metals", *Proceedings of the Fifth AIRAPT International Conference on High Pressure held in Moscow, USSR, May (1975); High Temperatures-High Pressures* 8, 649 (1977).
82. A.L. Ruoff and J. Wanagel, "High Pressures on Small Areas", *Science* 198, 1037 (1977).
83. W.C. Yohe and A.L. Ruoff, "Ultrafine-Grain Tantalum Carbide by High Pressure Hot Pressing", *Amer. Ceramic Soc. Bulletin* 57, 1123, (1978).
84. A.L. Ruoff, "On the Ultimate Yield Strength of Solids", *J. Appl. Phys.* 49, 197 (1978).
85. A.L. Ruoff, "Prospects for Metallic Hydrogen", *Proceedings of the International Conference on High Pressure and Low Temperature Physics held at Cleveland State University, Cleveland, OH, July 1977, Plenum Publishing Co., New York*, pp. 1-20 (1978).
86. A.L. Ruoff, "The Fracture and Yield Strengths of Diamond, Silicon and Germanium", in *High Pressure Science and Technology*, Ed. by K.D. Timmerhaus and M.S. Barber, Plenum Pub. Corp. 2, pp. 525-548 (1979).
87. A.L. Ruoff and K.S. Chan, "Transformation Pressure of ZnS by a New Primary Pressure Technique", in *High-Pressure Science and Technology*, Ed. by K.D. Timmerhaus and M.S. Barber, Plenum Pub. Corp., New York, Vol. 1, pp. 779-784 (1979).
88. J. Wanagel and A.L. Ruoff, "A Split Sphere 60,000 Ton Press", in *High -Pressure Science and Technology*, Ed. by K.D. Timmerhaus and M.S. Barber, Plenum Pub. Corp., New York, Vol. 2, pp. 840-846 (1979).

89. A.L. Ruoff and M.C. Gupta, "Studies of the High Pressure Transition in Sulfur", in High-Pressure Science and Technology, Ed. by K.D. Timmerhaus and M.S. Barber, Plenum Pub. Corp., New York, Vol. 1, pp. 161-171 (1979).
90. A.L. Ruoff and L.C. Chhabildas, "Status of Equation of State of Solids", in High-Pressure Science and Technology, Ed. by K.D. Timmerhaus and M.S. Barber, Plenum Pub. Corp., New York, Vol. 1, pp. 19-32 (1979).
91. A.L. Ruoff, "Linear Ruby Scale and One Megabar?" in High-Pressure Science and Technology, Ed. by K.D. Timmerhaus and M.S. Barber, Plenum Pub. Corp., New York, Vol. 1, pp. 754-772 (1979).
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93. Mool C. Gupta and A.L. Ruoff, "Film-Thickness Effect on the Calculation Pressure Using Hertz' Law", *J. Appl. Phys.* 50, 825 (1979).
94. Mool C. Gupta and A.L. Ruoff, "Static Compression of Al<sub>2</sub>O<sub>3</sub> to 1.2 Mbars (120 GPa)" *J. Appl. Phys.* 50, 827 (1979).
95. Mool C. Gupta and A.L. Ruoff, "Transition in Amorphous Selenium Under High Pressure", *J. Appl. Phys.* 49, 5880 (1979).
96. David A. Nelson, Jr. and A.L. Ruoff, "Metallic Xenon at Static Pressures", *Phys. Rev. Letts.* 42, 383 (1979).
97. Mool C. Gupta and A.L. Ruoff, "Preparation of Micron Thick Specimens for High Pressure Study", *Rev. Sci. Instrum.* 50, 135 (1979).
98. A.L. Ruoff, "Opportunities and Impact of Microfabricated Instruments in Physics and Materials Science", Proceedings of NSF Workshop on Opportunities for Microstructure Science, Engineering and Technology, Cornell University, November 1978.
99. David A. Nelson, Jr. and A.L. Ruoff, "Diamond: An Efficient Source of Soft X-rays for High-Resolution X-ray Lithography", *J. Appl. Phys.* 49, 5365 (1978).

100. A.L. Ruoff, "Analysis of Resistance-Versus-Pressure Relations for the Diamond Indentor-Anvil System", J. Appl. Phys. 50, 2757 (1979).
101. David A. Nelson, Jr. and A.L. Ruoff, "The Compressive Strength of Perfect Diamond", J. Appl. Phys. 50, 2763 (1979).
102. A.L. Ruoff, "On the Yield Strength of Diamond", J. Appl. Phys. 50, 3354 (1979).
103. A.L. Ruoff, "Megabar Pressures in Submicron Volumes", Cornell Quarterly 14, #1, 2 (1979).
104. K. Balasubramanyam, K.L. Chopra and A.L. Ruoff, "Photoresist Properties of Obliquely Deposited Amorphous Ge-Se Films", Bull. Am. Phys. Soc. 25, #3, 179.
105. Mool C. Gupta and A.L. Ruoff, "Static Compression of Silicon in the [100] and in the [111] Directions", J. Appl. Phys. 51, 1072 (1980).
106. A.L. Ruoff, "Estimates of Uncertainty in Isotherms Deduced from Hugoniot Resulting from Shockwave Generated Defects", J. Appl. Phys. 51, 6221 (1980).
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